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| 10/089,183 | 03/27/2002 | Takayuki Miyashita | 009760-016 | 5114 |
| 21839 | 7590 | 03/01/2004 | EXAMINER | |
| BURNS DOANE SWECKER & MATHIS L L P | | | SADULA, JENNIFER R | |
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| | | | 1756 | |

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/089,183

Applicant(s)

MIYASHITA ET AL.

Examiner

Jennifer R. Sadula

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

The following Office Action is a complete response to the amendment and arguments filed 11/13/03.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The applicants claim a liquid crystal polymer composition comprising a liquid crystal polymer and a plate-shaped filler wherein it is assumed by the examiner that the plate shaped filler have specific dimensions (see rejection of claims based upon 35 USC 112(2) for clarification of this assumption). The specification, beginning on page 1, recites that the polymer has excellent low warp wherein the research conducted was to provide a polymer with low warp without notably decreasing mechanical properties (page 2). The Applicants then begin to recite that the materials be of specified diameter however on page 6 the applicants state that the low warp characteristic is fulfilled via certain ratios of polymer to filler. The only reference to size of the particulate matter is in the paragraph beginning at the end of page 6 and completing on page 7. If this is what

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the applicants argue to be the patentable distinction of their invention, no mention has been made as to how they achieve such specified sizing and dimension; no mention is made as to how they found that such dimension adds to the invention. In fact, the only mention made as to how this polymer is better than previous polymers is in the ratio of materials and having nothing to do with the size of the materials utilized. Therefore, in light of the Applicants' own specific teaching it is apparent to the Examiner that such sizes are obvious design choices or even inherent to the materials taught.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation of a LCP composition comprising 100pbw of a LCP and 5-100 pwb of a plate shaped filler satisfying the formulae 1 and 2 and having an average particle diameter of 0.5 to 100 μ m. It is unclear what formula 1, 2, and the average particle size are modifying. For example, is the particle size with regard to the LCP composition, the LCP or the filler? Are formulae 1 and 2 satisfied by the LCP composition, the LCP or the filler? Even though the dimensions are specified for the filler- it is unclear if the filler is pre-composition, post-composition or both. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-9, 16-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamoto et al., U.S. Patent No. 5,085,807 ("Okamoto").

Okamoto teaches a flame retardant liquid crystal polyester composition comprising 100pbw of a liquid crystal polyester, 0.5 to 30 pbw of a polymeric flame retardant material having an average dispersed particle diameter not larger than 2.5µm, and up to 200 pbw (per 100 pbw of the combination of the polyester and flame retardant) of a filler (1:54-2:7). The polyester material may be a variety of different liquid crystalline materials and combinations of polyesters. The filler of Okamoto is taught to be a variety of different materials depending upon the intended use. The material can be fibrous, powdery, granular and plate shaped and includes such materials as glass, carbon, polyamide, mica, talc, silica, calcium carbonate, wollastonite and titanium oxides (9:40-60). In accordance with Applicant's teaching it is inherent to the nature of the materials to be within the ranges as specified by the applicants.

With regard to applicants' claim 6 and all other claims regarding the formation of a connector, Okamoto teaches the composition for use in the production of molded articles requiring materials of superior flame retardancy, heat resistance appearance and mechanical properties. Furthermore, Okamoto teaches the formation be three-

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dimensional such as a rod, tube, sheet and the like (12:3-9). It is the examiner's position that a connector falls within this scope.

Claims 1-4, 6-9, 16-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Umetsu et al., U.S. Patent No. 5,804,634 ("Umetsu").

Umetsu teaches a liquid crystalline resin compound including 100pbw of a liquid crystalline material and about 5-200pbw of an inorganic filler material wherein the inorganic filler has an average aspect ratio in the range of 3 to 25 (abstract). The resin compound contains a filler in the form of a fiber, powder, particle or plate wherein examples include mica, talc, silica, glass, and the like (6:47-60). Two or more fillers may be used in combination with one another, especially when glass fibers are involved (6:60-67). The platy filler maybe measured for average aspect ratio, average major axis and average thickness as specified in column 7. In the case of such a filler the particle diameter should be less than 100 μ m. Thus in accordance with Applicant's teaching it is inherent to the nature of the materials to be within the ranges as specified by the applicants. Umetsu further teaches the materials to be for use in the production of molded articles wherein the molded articles require a material being superior in flowability and having good mechanical properties such as balanced rigidity and toughness (abstract).

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Claims 1-4 and 8-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sandor et al., U.S. Patent No. 5,851,668 ("Sandor").

Sandor teaches cut-resistant fibers containing hard fillers wherein the fiber is made of a resin comprising a liquid crystalline polyester and a filler in an amount of 0.05% to about 20% by weight (abstract). A particulate form of the filler may be used such as platelets or flat particles (5:25-30). The filler particles should be small enough to easily pass through the spinneret apertures and should be filtered in a way such that the particles larger than about 6 microns are excluded. In general, the particles should have an average diameter of less than about 20 microns (5:42-60). The filler is distributed uniformly throughout the resin. Particle sizes are shown throughout the tables beginning with table 6. In accordance with Applicant's teaching it is inherent to the nature of the materials to be within the ranges as specified by the applicants.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Okamoto in view of Yamada, or, alternatively, Yamada in view of Okamoto.

To begin with, Okamoto teaches a flame retardant liquid crystal polyester composition comprising 100pbw of a liquid crystal polyester, 0.5 to 30 pbw of a polymeric flame retardant material having an average dispersed particle diameter not

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larger than $2.5\mu\text{m}$, and up to 200 pbw (per 100 pbw of the combination of the polyester and flame retardant) of a filler (1:54-2:7). The polyester material may be a variety of different liquid crystalline materials and combinations of polyesters. The filler of Okamoto is taught to be a variety of different materials depending upon the intended use. The material can be fibrous, powdery, granular and plate shaped and includes such materials as glass, carbon, polyamide, mica, talc, silica, calcium carbonate, wollastonite and titanium oxides (9:40-60). In accordance with Applicant's teaching it is inherent to the nature of the materials to be within the ranges as specified by the applicants. However, Okamoto is silent with regard to the liquid crystal polyester being a polyester amide.

As stated above, Yamada teaches a thermotropic liquid crystalline polyester resin material containing 5-60% of an inorganic filler such as carbonates of alkaline earth metals wherein the resin formed therefrom, as well as the articles produced from such a resin, exhibit excellent appearance, thermal resistance, and workability (abstract). The particle size of the inorganic filler materials may be in the range of $1\text{-}20\mu\text{m}$ (6:21-31). The formed articles prepared are suitable for use in machinery, automotive and office part making (9:10-18) thereby incorporating the manufacturing of connectors. With regard to claim 5 and all other claims regarding the use of a polyester amide, Yamada teaches one of the precursors to the thermotropic polyester to be aromatic diamines (5:8-21).

It would have been obvious to one of ordinary skill in the art at the time of invention to make the resin materials of Okamoto including the LCP aromatic diamines of Yamada as Okamoto teaches merely the use of polyester derivatives for use with the invention and the LCP's of Yamada are polyester derivations.

Alternatively, Yamada teaches the invention substantially as claimed however merely teaches the use of inorganic filler materials, thereby failing to teach the specific filler materials of talc, mica, kaolin or graphite. Okamoto teaches such materials for the exact uses as specified by Yamada. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to make the resin composition of Yamada with the fillers of Okamoto as Okamoto teaches such filler materials to be fur use in giving flame retardancy, heat resistance and superior mechanical and design properties.

Response to Arguments

Applicant's arguments filed 11/13/03 have been fully considered but they are not persuasive. With regard to the claim rejection based upon 112(1), Applicants argue 103 reasoning for 112(1) rejections and fail to address where in the specification such teaching is found. Therefore this rejection is maintained and made final. With regard to the rejection based upon 112(2), the Examiner suggests clarifying language such as "wherein the plate shaped filler satisfy" to replace the term "satisfying" in claim 1, line 3.

With regard to the art rejections, Examiner notes that the Applicants argue with regard to Okamoto, Yamada, Allen, Umetsu, Sandor and Murakami that these references fail to teach of a plate-shaped filler having dimensions as specified in the Applicants' claims. Further the Examiner notes that with regard to Umetsu and Murakami that the Applicants argue that the aspect ratio in Umetsu is not a three-dimensional configuration and that in Murakami an aspect ration of 1 to 2 for a powder filler specifies a generally globular particle that is expressly outside the limitations of the Applicants' claims.

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Examiner agrees in part and disagrees in part and thus the rejection has been amended accordingly.

Applicants claim the use of a LCP with 5-100 parts by weight of a plate-shaped filler (B) satisfying the following formulae (1) and (2) and having an average particle diameter of 0.5 - 100 μm wherein $D/W \leq 5$ (1) and $3 \leq W/H \leq 200$ (2) wherein is the maximum particle diameter of the plate-shaped filler (B), and the direction of the diameter D is defined as x; W is a particle's diameter which is in the direction y at the right angle the direction x; and H is a thickness of the particle in the direction of which is vertical to the xy-plane (Applicants' claim 1).

With regard to Okamoto, Examiner notes that that the average dispersed particle diameter is not larger than 2.5 μm or finer (11:1-13). As far as the filler being "plate shaped", Okamoto teaches that the material can be fibrous, powdery, granular and plate shaped and includes such materials as glass, carbon, polyamide, mica, talc, silica, calcium carbonate, wollastonite and titanium oxides (9:40-60). It has yet to be shown how this does not anticipate as the Applicants' claimed ranges are extremely broad and, for example, depending on which direction is determined to be the x-axis, the ratio of D/W will be less than 5.

With regard to Yamada, (wherein the reference teaches a particle size of the inorganic filler materials may be in the range of 1-20 μm (6:21-31)), and Allen (wherein the reference teaches that with respect to the fillers a finely divided form is preferred which has an average particle diameter of 0.05-50 microns (13:49-14:23)), these fillers are not taught to be plate-shaped and thus the rejection has been withdrawn.

With regard to Umetsu the reference teaches a liquid crystalline resin compound including 100pbw of a liquid crystalline material and about 5-200pbw of an inorganic filler material wherein the inorganic filler has an average aspect ratio in the range of 3 to 25 (abstract). The resin compound contains a filler in the form of a fiber, powder, particle or plate wherein examples include mica, talc, silica, glass, and the like (6:47-60). Two or more fillers may be used in combination with one another, especially when glass fibers are involved (6:60-67). The platy filler maybe measured for average aspect ratio, average major axis and average thickness as specified in column 7. In the case of such a filler the particle diameter should be less than 100 μ m. However, Applicants argued that in Umetsu the aspect ratio is not a three-dimensional configuration. It is unclear to the Examiner how the materials of Umetsu fail to satisfy the Applicants' claimed formula. It is the Examiner's opinion that just because the reference teaches a specific calculation and ratio, this does not imply that the measurements fail to satisfy another ratio.

With regard to Sandor, the reference teaches a particulate form of the filler may be used such as platelets or flat particles (5:25-30) wherein the particles should have an average diameter of less than about 20 microns (5:42-60). As stated with Okamoto, it has yet to be shown how this does not anticipate as the Applicants' claimed ranges are extremely broad and, for example, depending on which direction is determined to be the x-axis, the ratio of D/W will be less than 5.

With regard to Murakami, the Examiner agrees that the Applicants have carved out their claimed invention to exclude an aspect ratio of 1 to 2 for a powder filler as such specifies a generally globular particle. Therefore this rejection has been withdrawn.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Takatani et al., U.S. Patent No. 5,610,219 ("Takatani") teaches resin compounds for molding precision parts containing specific amounts of aromatic thermotropic liquid crystalline polyester and a filler material (abstract). The filler are a variety of particle sizes and shapes and are present in an amount of at least 15% by weight (6:20-61).

Hotta et al., U.S. Patent No. 5,912,320 ("Hotta") teaches an inorganic fillers for use with resins wherein the inorganic filler includes 5-40wt% of fine particles having an average diameter of 1 μ m or less (3:25-27). The mixing ratio should be preferably 80wt% or less (6:8-18).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

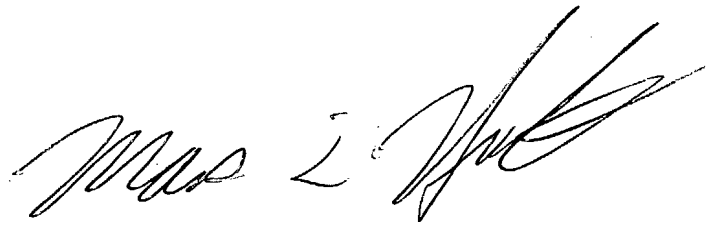
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is 571.272.1391. The examiner can normally be reached on Monday through Friday, 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 571.272.1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

A handwritten signature in black ink, appearing to read "Mark F. Huff", with a stylized flourish at the end.

JRS
February 22, 2004

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700